
 <b>Independent Verification &amp; Validation Facility</b>	<b>Independent Assessments</b>	<b>53.IT.0009-2</b> <b>Revision: Rev E</b> <b>Effective Date:</b> <b>September 1999</b>
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<b>APPROVAL SIGNATURES</b>		<b>DATE</b>
Louis Blazy (original signature on file)	IV&V Facility Director	09/09/99

<b>REVISION HISTORY</b>			
Rev No.	Description of Change	Author	Effective Date
Basic	Initial Release	Siamak Yassini IT/332	08/14/97
A	Changed Sections: modified 2.0, 4.0, 5.2.1, 5.2.3, 5.5.1.3, 5.5.1.4, 5.5.2.2, 5.5.2.5, 5.5.2.6, 6.0. Added criteria evaluation under section 5.5, section 5.5.2.1 totally revised Added more references under section 4.0 Section 6.0 is modified to reference to NPG 1441.1	Siamak Yassini IT/332	02/02/98
B	Changed sections: 3.0 added more definitions, 5.2.3 minor wordings, 5.5.1.4, 5.5.1.5 added contents of the IAR, 5.5.3 polished to meet the CRA WI contents, 7.2 and 7.3 minor changes into the flow to match with CRA WI	Siamak Yassini IT/332	04/02/98
C	Format change to be consistent with Ames	Siamak Yassini IT/332	04/29/98
D	Quality Record - format changes	Siamak Yassini IT/332	08/26/98
E	References to Ames Quality Manual replaced with references to IV&V Facility Quality Manual	Siamak Yassini IT/332	09/10/99

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<b>REFERENCE DOCUMENTS</b>	
Document Number	Document Title
53.IT.0009-2-1	Criticality Risk Assessment
53.IT.0009-4	Project Management
53.IT.0016	Control of Quality Records
NPG 1441.1	NASA Records Retention Schedules

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## **1.0 Purpose**

The purpose of this procedure is to record the method used by the IV&V Facility when performing assessments. This documentation will ensure uniformity of the assessment process across a variety of programs.

## **2.0 Scope**

This procedure applies to all IV&V Facility subcontractor and civil service personnel who perform assessments for the IV&V Facility.

## **3.0 Definitions**

### **3.1 Independent Assessment**

An independent review and analysis of the systems software development life-cycle and products; performed by identifying critical software risks which could jeopardize mission safety and success.

### **3.2 Independent Assessment Team (IAT)**

The IV&V Facility Civil Service and/or subcontractor personnel perform the independent assessment.

### **3.3 Independent Assessment Manager (IAM)**

The IV&V Facility Civil Servant who is managing the independent assessment tasks.


### **3.4 Independent Assessment Report (IAR)**

The assessment report that documents the findings and recommendations.

### **3.5 CRA - Criticality Risk Assessment**

### **3.6 Computer Software Component (CSC)**

A distinct part of a Computer Software Configuration Item (CSCI). CSCs may be further decomposed into other CSCs and Computer Software Units (CSUs).

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### **3.7 Computer Software Configuration Item (CSCI)**


A configuration item for computer software. In many projects, CSCIs are defined along processor boundaries, regardless of how many CSCs are involved.

### **3.8 Computer Software Unit (CSU)**

An element specified in the design of a CSC that is separately testable.

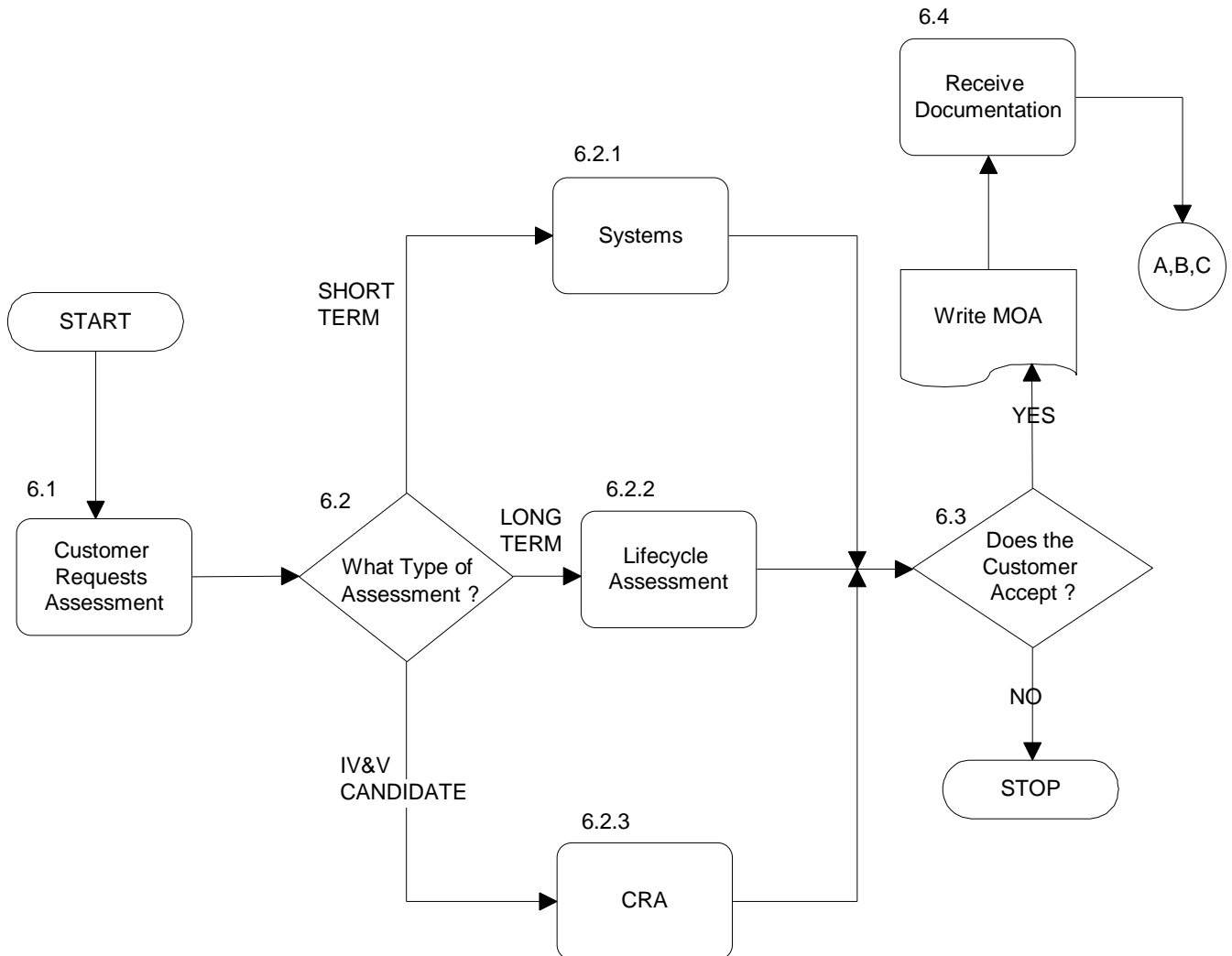
### **3.9 Data Item Description (DID)**


Provides a vehicle for documenting and communicating information relevant to the requirements.

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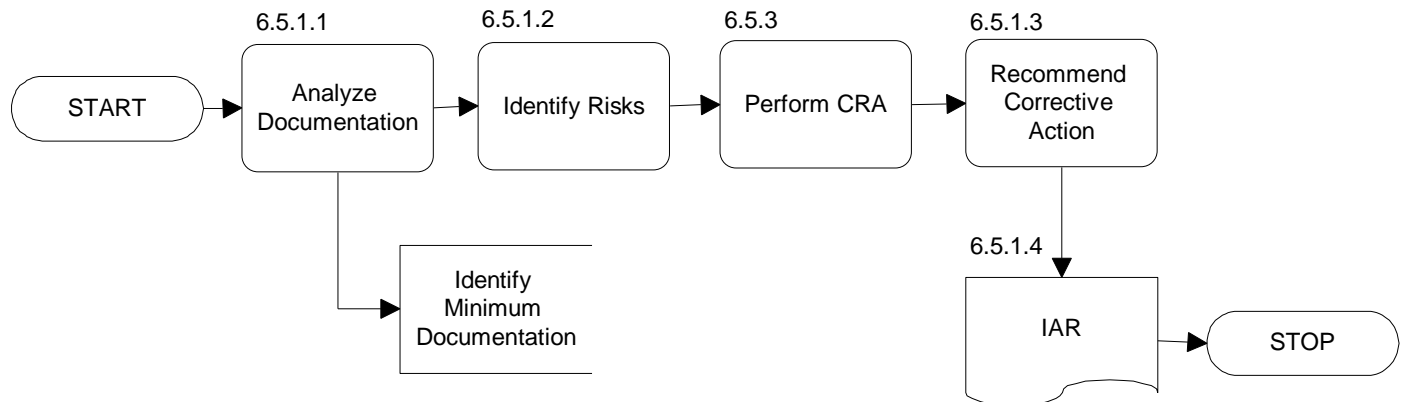
## 4.0 Flowchart


### 4.1 Assessment Procedure



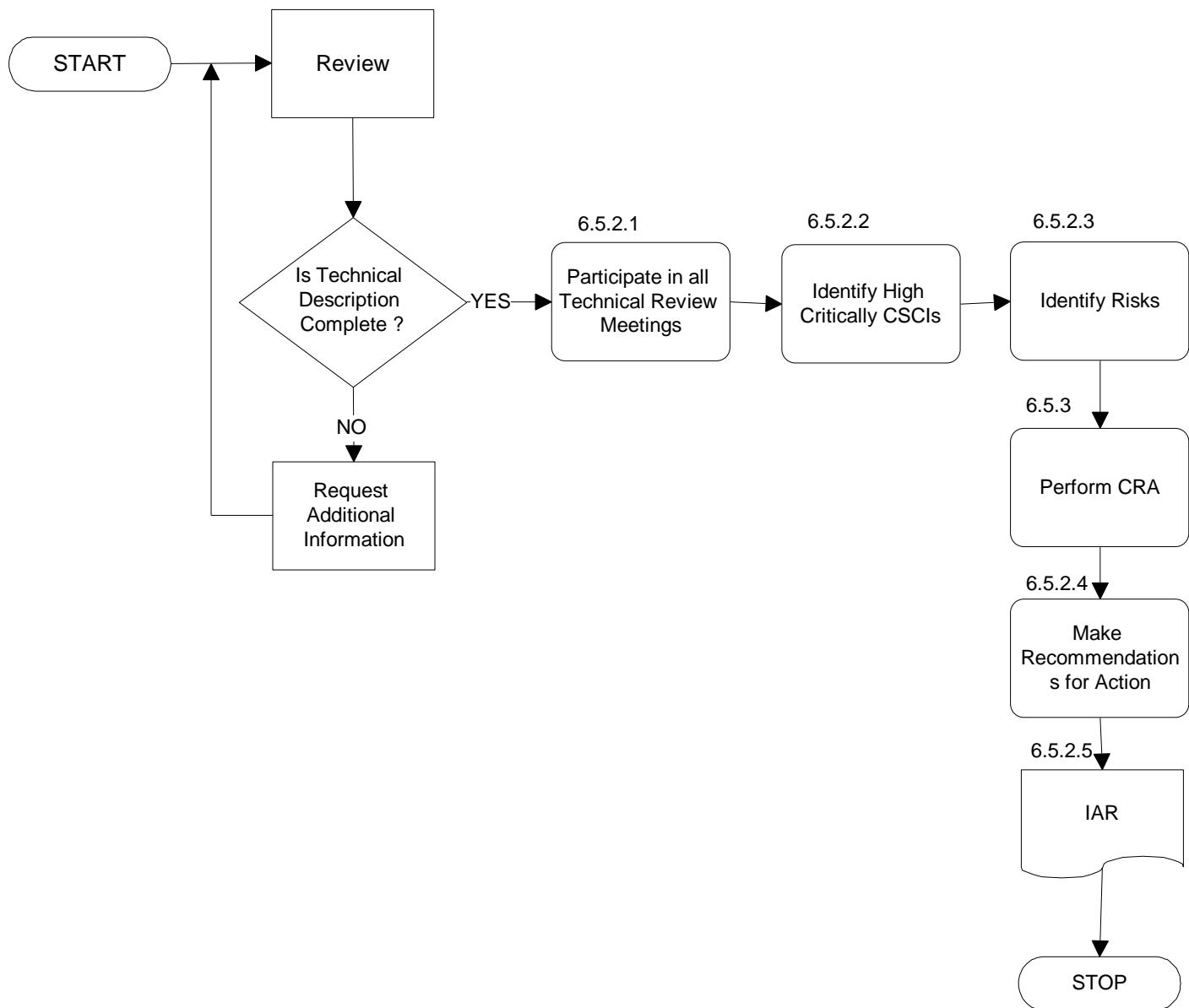
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## 4.2 Systems Assessment



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### 4.3 Lifecycle Assessment



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## 5.0 Responsibilities

Reference to Section 6.0

## 6.0 Procedure

### 6.1 Customer Request

All software assessments are initiated by a customer request.

### 6.2 Type of Assessment


The Independent Assessment Manager (IAM) shall make a determination for the level of assessment necessary based on the type of involvement requested by the customer. The following types of assessment are considered:

#### 6.2.1 Systems Assessment

When short-term involvement is requested by the customer, the IAM shall recommend systems level assessment at any phase of life-cycle development. The IAT shall perform a systems assessment to evaluate basic requirements, design, testing, and processes of systems under development. The IAT identifies risks associated with the safety and criticality of the mission and makes recommendations for corrective action.

#### 6.2.2 Life-cycle Assessment

When long-term involvement is requested by the customer, the IAT manager shall recommend a life-cycle assessment. A life-cycle development assessment identifies risks associated with mission success during any software development life-cycle phase and makes recommendations for corrective action. The IAT may also perform a mission readiness assessment of updated systems software changes and anomalies per mission as requested by the customer.

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### **6.2.3 Criticality Risk Assessment**

When the customer requests that the need for IV&V be assessed, the IAM shall recommend a Criticality Risk Assessment (CRA). The IAT shall perform a CRA to identify the systems software components that are more mission safety critical with higher development risks: considering complexity, size, and new technology, etc. The IAT will determine, by the criticality level of risk determined by the Work Instruction procedure, if an IV&V and or any other recommendations should be made.

### **6.3 Customer Review**


The IAM shall discuss the appropriate type of assessment with the customer. If the customer is in agreement, the IV&V Facility shall work with the customer to prepare a Memorandum of Agreement (MOA). (Reference to MOA section of the IV&V Project Management Process)

### **6.4 Request Documentation**

Upon approval of the MOA, the IAM shall request all documentation deemed necessary to perform the requested level of assessment. Documentation may include any or all of the documents listed in section 6.4.1.

#### **6.4.1 Required Documentation**

- Software Requirements Specification (SRS)
- Interface Control Document (ICD)
- Software Design Document (SDD)
- Software Test Plan (STP)
- Software Test Description (STD)
- Software Development Plan (SDP)
- Quality Assurance Plan (QA)
- Configuration Management Manual (CM)
- Project Plan
- Systems Requirements Document
- System and Software Development Schedule
- Software Metrics
- Concept of Operations

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## **6.5 Perform Assessment**

Upon receipt of the requested documentation, the IAT shall begin the assessment process. The following evaluation criteria may be considered, depending on the type and level of assessment being performed:

1. Traceability to the indicated documents
  - Traceability, adequacy, consistency of indicated documents for system specification, requirements, and interfaces
2. Appropriate analysis, design, and coding techniques
  - Evaluate design and source code for compliance with established standards, practices and conventions.
3. Adequate test coverage of requirements
  - Adequate detail in specifying test procedures
  - Completeness of testing

### **6.5.1 Systems Assessment**

#### **6.5.1.1 Process Analysis**


The IAT shall review and analyze the program documentation provided, applicable standards, and any other project materials provided by the customer. This analysis approach will identify technical issues that could result in problems with requirements, design, verification and validation testing, and operational readiness.

#### **6.5.1.2 Identify Risks**

The IAT shall assess the acceptability of the life-cycle development process relative to project specifications and accepted standards during the systems assessment. The IAT will then identify any issues which could increase the risk of mission failures.

#### **6.5.1.3 Recommend Corrective Actions**

The IAT shall recommend a corrective action for each identified risk to the customer in the IAR.

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#### **6.5.1.4 Independent Assessment Report (IAR)**

The IAT shall prepare a draft IAR that documents the findings and recommendations. This draft report shall be submitted to the customer and members of the IV&V Facility technical team selected by IAM for review. The final report shall be an update to the draft assessment report including all of the comments by review team and customer.

The IAR shall contain but is not limited to the following areas:


- Purpose
- Background
- Reference Documents
- Overview
- Process Analysis
- Criticality Risk Assessment
- Conclusions
- Recommendations and or corrective actions
- Acronyms and Abbreviations

#### **6.5.2 Life-cycle Assessment**

##### **6.5.2.1 Process Analysis**

The IAT shall analyze new and revised process documentation as they relate to software functions defined in the MOA for each major software review. Analyses shall address the degree to which these process documents meet the goals of the DIDs to which they were produced. The IAT shall perform analyses in each of the following process areas to ensure that the processes are being implemented according to the associated plans, and that the implementation is appropriate for the program environment at the time of the analyses:

- Software Interface Document Control
- Software Configuration Management
- Software Development
- Software Test
- Software Integration

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#### **6.5.2.2 Identify High Criticality CSCIs**

The IAT shall define the high criticality CSCIs and analyze each, focusing on criticality functions where failure could result in mission failure and ultimately jeopardize the safety of the mission.

#### **6.5.2.3 Identify Risks**

The IAT shall assess the acceptability of the life-cycle development process relative to project specifications and accepted standards in order to identify the risks of high criticality CSCIs associated with mission safety and success.

#### **5.5.2.4 Recommend Corrective Actions**

The IAT shall recommend a corrective action for each identified risk to the customer in the IAR.

#### **6.5.2.5 Independent Assessment Report (IAR)**


The IAT shall prepare a draft IAR that documents the findings and recommendations. This draft shall be submitted to the customer and members of the IV&V Facility technical team selected by IAM for review. The final report shall be an update to the draft IAR including all of the comments by the review team and customer. The IAR shall contain the items on 6.5.1.4.

#### **6.5.3 Criticality Risk Assessment**

The IAT shall perform a CRA per Work Instruction (53.IT.0009-2-1) to identify the systems software components that are more mission safety critical with higher development risks and make a recommendation to the project as determined by the criticality level of risk analysis.

### **7.0 Metrics**

This section is not applicable to this process.

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## 8.0 Records

The following records will be generated and managed in accordance with 53.IT.0016 and reference to NPG 1441.1 NASA Records Retention Schedules.

Document Name and Identification Number	User Responsible for Record Retention	Retention Requirement	Location
Memorandum Of Agreement (MOA)	IAT Manager	Permanent	Project File Electronic File
Independent Assessment Report (IAR)	IAT Manager	Permanent	Project File Electronic File